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PROBLEM-BASED LEARNING CASE WRITING IN MEDICAL SCIENCE

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ABSTRACT

It is common practice in problem-based learning for students to solve cases developed by faculty. Rare is the practice of creating learning environments in which students construct their own cases. This paper examines the design and implementation of a 15-week problem-based learning writing course for graduate students in medical science. The perceptions of the course participants are also reported. The paper discusses some of the challenges encountered during the course. The case writing course in medical science provided a forum for students to develop their communication, problem solving, and lifelong learning skills.

PURPOSE

The purpose of this study was to examine students' perceptions of problem-based learning (PBL) case writing in medical science in the Master of Science in Medical Science (MSMS) Program at Indiana University School of Medicine. The perceptions of the participants were collected, analyzed and reported using data from journal entries and a questionnaire. The paper discusses some of the challenges encountered during the course. Students' responses suggest the case writing course provided a forum for them to develop their communication, problem solving, and lifelong learning skills.

IMPORTANCE OF THE STUDY

The case writing course furnished students an active learning environment in which they directed their learning in small groups facilitated by faculty. It allowed them to apply basic science to develop an interdisciplinary clinical case and to promote communication, problem solving and life-long learning skills in students. Using problem-based methodology as an instrument of learning, students worked in a small group to identify a significant medical problem, develop case objectives, research and assess the literature, identify possible learning issues, select and evaluate important data, and write a coherent case. These case writing learning activities seek to promote the development of higher-order cognitive outcomes (Braxton, 1993; Zoller, 1999) in the participants. Engaging students as case writers may expand their understanding of themselves not only as learners, but also as teachers. Such engagement may be critical to prepare graduate and professional students for the teaching role that is inherent in professional life.

PERSPECTIVES

An important goal of postsecondary education is the development of higher-order cognitive skills (Zoller, 1999). College classrooms must present challenging demands for application, analysis, synthesis, and evaluation of information (Braxton, 1993). Active learning in small groups places

responsibility on students to arrive at their own conclusions, rather than merely depend on the interpretations of faculty (Marsh & Roche, 1997). Problem-based learning as an educational approach has become an integral component of curricula in medical schools around the world (Norman & Schmidt, 1992).

According to Norman and Schmidt (1992), the PBL method can be characterized in the following manner: "a collection of carefully constructed problems is presented to small groups of students." The problems are usually embedded in a case typically developed by faculty. Students working in small groups are expected to discuss the problems generate hypotheses, identify and interpret important facts, formulate learning issues, make tentative explanations for the phenomena presented in the case and eventually solve the problem presented in a given case. Thus, students commonly solve cases developed by faculty rarely play and the role of case writers in PBL.

Employers, graduate and professional programs recognize the importance of students to communicate effectively in writing. Students must be prepared to communicate clearly with the public and in some cases contribute to deliberations regarding policy issues. Writing improves student learning, critical thinking and communication skills. Writing allows students to clarify their learning experiences and to articulate their thoughts. These cognitive features of writing apply to PBL case writing.

METHODS

Learning Context

A 15-week PBL case writing course was offered to second year graduate students in the Master of Science in Medical Science Program at Indiana University School of Medicine to enhance the learning, critical thinking and communication skills of students. A course syllabus was distributed to students at the start of the semester. The syllabus specified dates for completion of different components of the case.

Faculty facilitated all classroom sessions developing a PBL case on Chronic Obstructive Pulmonary Disease (COPD). The case is based on an actual patient case. The target audience of the case is first year MSMS and medical students.

The course was designed to promote the following objectives: (1) develop a clinical problem that includes concepts, facts and diagnostic test data; (2) communicate in writing and orally with peers; (3) evaluate and distinguish normal and abnormal findings in writing a case case; (4) apply and integrate basic science disciplines to write a coherent case; (5) formulate clear learning objectives; (6) consult with practicing physicians and other experts relevant to the case development process; and (7) research literature for information relevant to the case.

Participants spent 2 hours per session for 15 weeks developing a coherent PBL case. The breakdown of the sessions was as follows: (1) two sessions on course orientation; (2) two sessions on selecting the problem; (3) two sessions on developing course objectives; (4) three sessions on creating a narrative; (5) two sessions on generating data; (6) two sessions on editing and sequencing; (7) two sessions on formulating a facilitator guide; and (8) one session on presenting the case and evaluating the course.

Participants

Four students in the second year of the Master of Science in Medical Science Program at Indiana

University School of Medicine participated in this study. The students took two problem-based learning courses in medical science in the fall and spring semesters of their first year as graduate students in the MSMS Program. Students were required to consult with practicing physicians and researchers during the case development process.

DATA SOURCES

Students wrote and submitted two journal-entries during the fifth and tenth week of this fall semester course. Students provided verbal feedback throughout the course. A questionnaire was also used to collect student perceptions regarding the case writing course. Analysis for the study was based upon data from the journal entries and questionnaire.

RESULTS

Students perceived that case writing: (1) enhanced their understanding of the complexity of PBL; (2) is a time-intensive process requiring tolerance and collaboration between small group members; (3) is important to their professional development; (4) enabled them to know each other in ways they had not hitherto appreciated; and (5) promoted their skill at networking with faculty and physicians.

1. UNDERSTANDING PBL

The case writing experience deepened the participants' understanding of PBL as the following perceptions illustrate:

> I got to see how a case is developed. I got to research ideas and bring different ideas together for the case.
>
> I learned a lot about the case itself. The responsibility of defining our case and learning about the disease was great.
>
> Overall, I learned a lot and was frustrated a lot, but the end justifies the means, and our case was completed and agreed on by everyone. I think it is an excellent experience and will teach you to have an appreciation for those who create the cases in medical school.
>
> My experience developing the COPD case was a total learning process. I learned from every aspect of the case. For example, I learned about COPD and its diagnosis, mechanisms, exacerbates, treatments, etc. I also learned how to look at information from the physician's point-of-view. I realized that diagnosing a medical condition is not as easy as it seems.
>
> Developing this case has been an extreme challenge, but a good one. It is important to learn how to complete projects when you are in a group setting and scooping the benefits of learning from others.

2. TIME ON TASK

Students in the case writing course observed writing a PBL case required more time than they anticipated. Students met during scheduled class sessions and outside of class to work on their case. The following comments reveal the time-consuming nature of the course:

Developing a case takes a lot of time outside of the scheduled class and group meetings that may have taken away from other course work, but I understand the necessity now, especially since I wasn't an expert on the topic.

The process is difficult and one has to have a ton of patience to get things done. Don't be afraid to show initiative in developing the case. Sometimes this is the only way to get things done.

3. PROFESSIONAL DEVELOPMENT

An outcome of the case writing experience is that some participants thought that it contributed to an enhanced understanding of their career aspiration, medicine. The perceptions below shed light on this outcome:

I enjoyed the fun time we spent exploring the possibilities of developing a dramatic case. I also learned a lot about some issues I was unaware of. This process was definitely an integral part of my professional training.

Developing a case this semester was definitely a different experience, even from solving a case. The lessons, skills, and patience I learned during this developmental process will be a stepping-stone to my experiences as a professional.

4. GROUP DYNAMICS

The case development process provided a context to understand the nature of group dynamics. Although the process produced growth in the students, the group learning process frustrated some students. Small groups are as good as the members who make them. Group members must be willing to tolerate each other and synchronize their efforts and schedules in order to achieve group and individual objectives. The following perceptions shed light on the nature of group dynamics during case writing:

Being dependent on individuals to write an entire case and their dedication or attention was devoted to something else besides the writing process. I enjoyed writing this case, but the total dependency on other people to help contribute to the case was sometimes frustrating.

It was interesting to see what it takes to put together a medical case that integrates the basic sciences and clinic manifestations. Although, as a group we had some good times, there were times it got rough to work with other. I just decided to put personal issues aside and just focus on the task at hand. This made the experience a little less desirable.

Just as important, I learned that sometimes it is not possible to run from different personalities, especially those that are disagreeable. The forced coexistence was beneficial for helping gain attributes such as patience and adaptability that will certainly help me in the medical field. I also learned that even if two people instead of all of the members do it, the case would get done.

I learned how to work with the dynamic personalities of my classmates.

5. NETWORKING

The participants thought of their interactions with faculty and physicians to be beneficial. Through these interactions, they learned more about medicine. The following perceptions suggest that the student's networking skill was enhanced by the case development experience.

> The responsibility of defining our case, learning about the disease, and collaborating with physicians and faculty members to help develop the case.
>
> You learn how to use your resources to the maximum and collaborating with physicians and group members is also a key to the learning process.
>
> Using resources like medical doctors and faculty members to develop this case made me better understand their work and medicine. That was a plus for me.

DISCUSSION

This study examined the use of a problem-based learning case writing course in medical science at Indiana University School of Medicine. Although previous studies have shown that students have a positive attitude towards PBL (Kaufman, 1996; Caplow, Donaldson, Kardash, & Hosokawa, 1997), this study showed that while participants benefited from the case writing experience, they were also frustrated by it.

In spite of the prior exposure of participants solving PBL cases as first year graduate students, some of their frustration may be attributed to a lack of experience with the case development process. This finding suggest a need to refine the orientation to case writing and increase the frequency of journal-entries in order to more closely monitor the performance of the PBL small group inside and outside of class sessions.

Writing a PBL case was challenging and required trust, collaboration and optimum contribution from team members. The absence of one or all of these factors may have affected the productivity of the group. A further investigation may be needed to shed more light on the nature of interactions of the participants especially outside the classroom.

CONCLUSIONS

The study attempted to further engage students in their own learning. Based on the perceptions of the participants, a PBL case writing course is useful in promoting student development. Beyond solving cases developed by faculty, case writing challenged students to take ownership of their learning in ways they hitherto had not experienced.

Case writing empowered the participants to construct their own knowledge and understandings. It challenged them to actualize their potential as learners and teachers. Given the intensity of absorption in the process to develop a case and the understanding about PBL, it is likely that some students may carry over that feeling to work done on their own beyond this PBL case writing experience. PBL case writing was an excellent vehicle to demonstrate learning and teaching to students.

The use of self-reports to limited this study. The participants in the study reported what they felt they learned from the case writing experience and not necessarily how well they learned.

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